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USGS Studies Bear Response to Weapons Training

The USGS and U.S. Marine Corps Base Camp Lejeune collaborated on a study to assess the effects of military activities on black bears within the 16,691-hectare Greater Sandy Run Acquisition (GSRA) pocosin (peatlands with a low and dense evergreen shrub layer) habitat of the Atlantic Coastal Plain. Because this area provides high-quality habitat for the black bear, resource managers at Camp Lejeune were specifically interested in the effect of live-fire weapons training on the black bear population.

USGS captured 14 bears within the pocosin habitat area. Radio collars were placed on the bears and the data were collected from 1,494 telemetry locations. The GSRA was divided into three human auditory disturbance level areas based on noise generated from live-fire exercises with zone one and three representing the least and most disturbance, respectively. Results indicate that differences in bear use among the three noise zone areas was a function of the prevalence of selected vegetation types and not a response to military activity. Temporal analysis further suggested that bears did not respond to weapons exercises; the distance of bears to the nearest firing area was not associated with the occurrence of live-fire. Bears are extremely adaptable animals and may

learn quickly based on experience that the noise associated with military weapons training has no consequence. Further study and refinement of the resource management model may be needed if there is a substantial increase in the number of firing ranges and firing activity, or if human encroachment outside the military reservation continues to alter the habitat.

USGS supplied Camp Lejeune with a GIS model that provides a science-based tool for managing bear habitat within the GSRA. This original research on black bear response to military training activities currently is being reviewed for possible publication in the *Journal of Wildlife Management*. For further information on this study, please contact the principal investigators Frank van Manen (frank_van_manen@usgs.gov) and Dave Telesco (davetelesco@bbcc.org), or the DoD collaborator on this project, Carmen Lombardo (lombardoca@lejeune.usmc.mil).

USGS-USACE National Conference on Ecosystem Restoration

The First National Conference on Ecosystem Restoration (NCER) co-sponsored by the U.S. Geological Survey and the U.S. Army Corps of Engineers (USACE), Jacksonville District, will be held December 6-10,

2004 in Orlando, Florida. The purpose of NCER is to provide a forum for physical, biological, and social scientists, engineers, resource managers, and policy-makers to share their knowledge and research results concerning ecosystem restoration throughout the United States. The public forum will exchange information and “lessons learned” on the opportunities and challenges of achieving restoration. Conference participants will have the opportunity to learn about large-scale ecosystem restoration programs (e.g., Glen Canyon, Everglades, San Francisco Bay/Delta, Chesapeake Bay, Great Lakes, Louisiana Coastal Area, Puget Sound, Upper Mississippi River, etc.) and what has contributed to the success of, as well as lessons learned from, these programs. The role of science in establishing goals and performance expectations for achieving successful and sustainable ecosystem restoration will be explored.

The conference is designed to bring together scientists, engineers, managers, and policy makers who are actively involved in and/or affected by all aspects of ecosystem restoration. Participants will interact in multiple settings to discuss state-of-the-art science planning, and management approaches to restoration and include federal, state, and local agency personnel, tribal governments, water resource engineers, water resource managers, environmental consultants, environmental policy managers, ecological scientists and researchers, hydrological modelers, students, and environmental interest groups.

The conference will feature a special hands-on workshop on The Role of Science in Adaptive Management and

several post-conference field trips will highlight nearby restoration projects in central Florida. For further information about the conference go to: <http://conference.ifas.ufl.edu/ecosystem/>

USGS Investigates the Effects of TCE and PCE on Burrowing Animals at Edwards Air Force Base

The USGS conducted a field validation study on the effects of volatile organic compounds on desert wildlife at Edwards Air Force Base (EAFB), California, as part of an ecological risk assessment for the installation. Ecological risk assessment often requires extrapolation of contaminant effects from laboratory experimentation to the field. However, laboratory studies only provide a compartmental understanding of natural systems, whereas the key question in natural environments is whether or not contaminants adversely affect wildlife populations. Contaminant exposure may compromise an animal’s physical condition and ultimately cause population changes such as decreased reproduction or increased susceptibility to disease or predation.

The objectives of this study were to determine the effects of trichloroethylene (TCE) and perchloroethylene (PCE) inhalation on the health and dynamics of wild rodents and reptiles living above contaminated ground water at EAFB. These compounds were selected because they were the most prevalent volatile organic compounds at EAFB.

Organic soil vapor concentrations were measured at three sites with aquifers containing large plumes of TCE or PCE

contamination (5 – 77 ppm) and two uncontaminated reference sites. Wild rodent and reptile population estimates, along with histopathic samples, were compared between sites to determine if indicators of ecological health and population dynamics were affected by chronic inhalation of TCE or PCE. Sites were trapped for seven consecutive nights during the study to estimate small mammal populations. Hematology evaluation, blood chemistry, and pathological examination of tissues from 57 small mammals and 29 side-blotched lizards were performed by the University of California Comparative Pathology Laboratory.

Soil gas concentrations of TCE and PCE were below levels observed to cause adverse effects in laboratory animals. Population estimates were similar at target and reference sites. Rodent blood indices did not reveal evidence of exposure. Pathology lesions observed were incidental, commonly found in wild or older animals, and not indicative of exposure to contaminants. These results suggest that lower and subsequently higher food web organisms probably were not affected by the presence of TCE or PCE in ground water at EAFB.

Results of the study are published in the September issue of *Environmental Toxicology and Chemistry*: Reference: SE Spring, AK Miles, and MJ Anderson. 2004. Effects of trichloroethylene and perchloroethylene on wild rodents at Edwards Air Force Base, California, USA. *Environmental Toxicology and Chemistry*. 23(9):2162-2169 http://www.werc.usgs.gov/pubbriefs/mil_espbaug2004.html. For additional information on this study, contact Sarah

Spring (Sarah.Spring@usgs.gov), Davis Field Station, Western Ecological Research Center.

USGS Assists U.S. Air Force on Assessment of Ecological Risk

The USGS, Western Ecological Research Center, Davis Field Station, is providing ecotoxicological expertise to evaluate ecological risk at more than 400 sites on Edwards Air Force Base (EAFB) for the Base's Environmental Restoration Program. EAFB covers approximately 470 square miles and is located on the western edge of the Mojave Desert. Ecological resources include sensitive habitats and native and introduced vegetation, wildlife, and sensitive species. Protection of ecological health is mandated under the National Contingency Plan, Comprehensive Environmental, Response, Compensation, and Liability Act (CERCLA). Environmental Restoration Program sites are physical areas that have been exposed to facility-related chemical contamination. The Environmental Restoration Program aims to reduce risk to human health and the environment through focused remedial investigations.

Ecological risk assessment (ERA) generally is defined as the process of identifying and quantifying risks to ecological (nonhuman) receptors. The USGS, working with the Air Force and state and federal regulators, has developed a screening process to quickly identify sites requiring no further ecological investigation in the ERA process from those requiring a Scoping ERA. This Pre-Scoping Assessment results in savings of time and money as resources are focused on sites with the

potential for ecological health risks. Sites that are not eliminated from the ERA process in the Pre-Scoping Assessment advance to a Scoping evaluation. The primary goal of the Scoping Ecological Risk Assessment conducted by USGS is to determine whether or not complete or potentially complete exposure pathways exist between facility-related contaminants in soil and/or ground water and potential ecological receptors at ERP sites. A pathway describes how exposure occurs between contaminants released into the environment and an ecological receptor. Scoping Ecological Risk Assessment evaluates the chemical, physical, and biological characterization of each site, determines the potential for complete exposure pathways and adverse ecological impacts, and identifies sites needing further evaluation in the Predictive Risk Assessment.

Twenty-one ERP sites remain in the Pre-Scoping Assessment process, and documentation for all sites will be completed in 2005. The guidelines used for the Scoping Ecological Risk Assessment at Edwards Air Force Base currently are being reviewed as a USGS Open File Report. For further information on this project, please contact A. Keith Miles (Keith_Miles@usgs.gov) or Carolyn Marn (Carolyn_Marn@usgs.gov).

USGS and USACE Study Dispersal of Federally Endangered Pallid Sturgeon

The USGS Leetown Science Center, S.O. Conte Anadromous Fish Research Center, and the U.S. Army Corps of Engineers, Omaha District, are studying the effect of water velocity on

downstream dispersal and the vertical swimming height of young Missouri River pallid sturgeons. Fish behavior specialists observe fish daily in artificial stream tanks during the dispersal period to document their innate behavior. Embryos (first life interval post-hatch) initiated dispersal, swim < 50 cm above the bottom, and are dispersed by the current like passive particles. As fish develop into larvae on about days 6–9, they swim-up 3 meters, or higher, from the bottom. Older fish return to swimming near the bottom. The present information suggests pallid sturgeon larvae have an innate behavior to swim far above the bottom during a few days to facilitate a long-distance dispersal. This behavioral information, along with temperatures of the river during fish development, can be used to model dispersal distance of fish from a spawning site.

Results of the 2003 study are available from the USACE, Omaha District. For further information, contact the USGS principal investigator Boyd Kynard (boyd_kynard@usgs.gov), or Kevin Mayberry (kevin.d.mayberry@nwo02.usace.army.mil).

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